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| 09/918,642 | 08/01/2001 | Yusaku Yamamoto | ASAM.0013 | 2652 |

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| EXAMINER |
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SCHUBERT, KEVIN R

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| ART UNIT | PAPER NUMBER |
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2137

DATE MAILED: 11/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/918,642

Applicant(s)

YAMAMOTO ET AL.

Examiner

Kevin Schubert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claims 5-8 have been considered. The examiner maintains the rejection.

Claim Rejections - 35 USC § 103

5 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

10 (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15 Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto, (Matsumoto, Tsutomu; Kato, Koki; Imai, Hideki. Speeding up Secret Computations with Insecure Auxiliary Devices. Advances in Cryptology- Crypto '88, Springer-Verlag Berlin Heidelberg. 1990. pp. 497-506).

20 As per claims 5 and 8, the applicant describes a solving system of an optimization problem including one or more client computer systems for accepting a solving request of an optimization problem from a user, a server computer system for finding a solution of the given optimization problem, and a network for connecting said client computer systems to said server computer system comprising the following limitations which are met by Matsumoto:

 Wherein said client computer system comprises:

25 a) a problem input interface for accepting an input of an optimization problem represented by an equality constraint $Ax = b$ defined by a coefficient matrix A having m rows and n columns and an m -dimensional right hand side vector b , an inequality constraint $x \geq 0$, and an objective function $f(x)$ to be minimized (page 500);

 b) a ciphering key input interface for accepting a ciphering key (page 500);

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c) a conversion matrix generation routine for generating a nonsingular matrix P having m rows and m columns and a permutation matrix Q having n rows and n columns by using said ciphering key input from said ciphering key input interface (page 500);

5 d) a problem conversion routine for converting said optimization problem into another optimization problem having a different equality constraint $(PAQ)y = Pb$, a different inequality constraint $y \geq 0$, and a different objective function $f(Qy)$, by using said nonsingular matrix P and said permutation matrix Q (page 500);

e) a problem output interface for sending the converted optimization problem to said server computer system via said network (page 500);

10 f) a reverse conversion routing for conducting reverse conversion $x = Qy$ on a solution y of the converted optimization problem received from said server computer system and thereby finding a solution x of the original problem (page 500);

The applicant should note that both Matsumoto and the applicant solve the exact same goal (see applicant: pages 5-6 and Matsumoto: pages 497-498).

15 The applicant should note that the applicant discloses that A is a matrix and b is a vector while Matsumoto discloses that both A and b are matrices. Since a vector is a specific kind of matrix, Matsumoto meets the limitations of the claim with regard to A being a matrix and b being a vector. Also, the applicant discloses that P is a nonsingular matrix and Q is a permutation matrix while Matsumoto discloses that both P and Q are permutation matrices. A permutation matrix is a nonsingular matrix, so

20 Matsumoto meets the limitations of the claim with regard to P being a nonsingular matrix and Q being a permutation matrix. The applicant discloses that x (and y in turn) both are subject to inequality constraint $x \geq 0$ while Matsumoto does not disclose that x has to be greater than or equal to 0. Because x (and y in turn) is open in Matsumoto's system, Matsumoto's system encompasses the inequality constraint $x \geq 0$ and therefore meets the limitations of the claim with regard to the inequality constraint. Finally,

25 Matsumoto's system includes a ciphering key input interface because the client in Matsumoto's system has means for enciphering a problem, or a ciphering key. Therefore, it is inherent that the client has an interface through which the key was received in the client system.

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Claims 5 and 8 are rejected under U.S.C. 103 instead of U.S.C. 102 because Matsumoto discloses the use of three matrices for enciphering a problem (P,Q, and R) while the applicant discloses the use of only two (P and Q). Following the math, the equality constraint in Matsumoto's system is $(PAQ)Y = PBR$. The equality constraint in the applicant's system is $(PAQ)Y = PB$. Furthermore, the reverse conversion equation is $X = QYR^{-1}$ in Matsumoto's system while the reverse conversion equation is $X = QY$ in the applicant's system.

In short, Matsumoto discloses a system identical to the applicant's except for the use of a third matrix R which further enciphers the original problem. It would have been obvious to one of ordinary skill in the art at the time the invention was filed to eliminate the use of the third matrix in Matsumoto's system because it allows for less processing to be done which reduces processing time.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Kagami, U.S. Patent No. 5,974,400.

As per claims 6 and 7, the applicant describes a solving service processing method in a system including one or more client systems and a server system for finding a solution of an optimization problem, said solving service processing method comprising the following steps which are met by Matsumoto in view of Kagami:

a) sending a program from said server system to said client system in response to a service start request issued by said client system (Kagami: Col 2, lines 12-37);

said program making a computer implement:

b) a problem input function of accepting a user's input of an optimization problem represented by an equality constraint $Ax = b$ defined by a coefficient matrix A having m rows and n columns and an m-dimensional right hand side vector b, an inequality constraint $x \geq 0$, and an objective function $f(x)$ to be minimized (Matsumoto: page 500);

c) a ciphering key input function of accepting a ciphering key from the user (Matsumoto: page 500);

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d) a conversion matrix generation function of generating a nonsingular matrix P having m rows and m columns and a permutation matrix Q having n rows and n columns by using said ciphering key input by said ciphering key input function (Matsumoto: page 500);

5 e) a problem conversion function of converting said optimization problem into another optimization problem having a different equality constraint $(PAQ)y = Pb$, a different inequality constraint $y \geq 0$, and a different objective function $f(Qy)$, by using said nonsingular matrix P and said permutation matrix Q (Matsumoto: page 500);

f) a problem output function of outputting the converted optimization problem to send it to an external system (Matsumoto: page 500);

10 g) a solution input function of receiving a solution y of the converted problem from the external system (Matsumoto: page 500);

h) a reverse conversion function of conducting reverse conversion $x = Qy$ on the solution y by using the matrix Q generated by the function of (3) and thereby finding a solution x of the original problem (Matsumoto: page 500);

15 i) a solution output function of outputting the reverse-converted solution x (Matsumoto: page 500);

j) receiving, in said client system, said program (Kagami: Col 2, lines 12-37);

k) implementing, in said client system, said functions of (1), (2), (3), (4), and (5) of said received program, thereby converting an optimization problem into a different problem, and sending said different problem to said server system (Matsumoto: page 500);

20 l) finding, in said server system, a solution of y of said received different problem (Matsumoto: page 500);

m) sending said solution y from said server system to said client system (Matsumoto: page 500);

n) implementing, in said client system, said functions of (6), (7), and (8) of said program, and thereby obtaining a solution x of the original optimization problem (Matsumoto: page 500);

25 Matsumoto discloses all the limitations of the claim except for the limitation that a program is transmitted from the server to the client for data processing in the client system.

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Kagami discloses a data processing environment in which a user requests a program from a server. In response to the request, the server sends the program to the client so that the client can use the program for data processing.

It would have been obvious to one of ordinary skill in the art at the time the invention was filed to combine the ideas of Kagami with those of Matsumoto because doing so allows the client to receive a program for data processing in the event that the data processing program is not already installed on the client system.

Response to Arguments

Applicant's Specification and Drawing amendments have been considered and entered. The Drawing amendments overcome the previous objection.

Applicant's arguments with respect to the 112 rejection of claim 7 have been fully considered and are persuasive in light of the amendment made. Therefore, the rejection has been withdrawn.

Applicant's arguments, submitted 10/20/05, with respect to claims 5-8 fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. The applicant merely reiterates the claims, on pages 2-6, and then asserts that the instant invention is patentably distinct on page 6.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

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shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Schubert whose telephone number is (571) 272-4239. The examiner can normally be reached on M-F 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emmanuel Moise can be reached on (571) 272-3865. The fax phone number for the organization where
10 this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should
15 you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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